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REMARKS/ARGUMENTS

Prior to entry of the amendments specified above, claims 18-34 are pending in the application under a non-final rejection. Claims 18, 19, 25, 28, 33 and 34 have been amended, as described below, to attend primarily to items of a cosmetic

I. Amendments to the Claims

Claim 18 has been amended to rewrite the phrase "converting the structured text subprograms to a plurality of corresponding graphical elements..." to "based on the structured text subprograms, generating a plurality of corresponding graphical elements...." This amendment is made to more distinctly point out the claimed subject matter and does not narrow the scope of the claim.

Claim 19 has been amended to add the conjunction "and" between penultimate element (c) and final element (d).

Claim 25 has been amended to stand in independent form, incorporating the limitations of claim 18 (as herein amended) and claim 24, from which it previously depended.

Claim 28 has been amended to add, prior to the word "modules," the words "wherein the."

Claim 33 has been amended to read that the flowchart is displayed in a form that can be enlarged or reduced, and to replace an erroneously placed colon at the end of the claim with a period. Support for the amendment can be found at page 8, para. 0026 of the application.

Claim 34 has been amended to more particularly point out the claimed invention. The language "recompiling in motion control flowchart notation" now reads "retranslation into motion control flowchart notation," support for which is found at page 8, para. 0027 and original claim 17 of the application.

No substantive amendment relating to patentability has been made, the scope of the claims has not been narrowed, and no new matter been added by these amendments.

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II. Double Patenting Rejection of Claim 19

Claim 19 stands rejected on the judicially-created doctrine of double patenting over co-pending, commonly assigned U.S. Patent Application Serial No. 09/911,586.

Applicants submit herewith a Terminal Disclaimer under 37 C.F.R. §§1.321(c), 1.130(b) and respectfully request that this basis for rejection accordingly be withdrawn.

III. Rejections Under 35 U.S.C. § 103(a)

A. General

The present invention relates in part to the programming of motion controllers used in manufacturing processes. Among other advantages, the invention enables an expansion of graphical elements or icons available for use in the complex and arduous task of motion control programming. See App. at 2, para. 0008. The invention does so by enabling structured text subprograms (which may be made available by the machine manufacturer, for example), to be the basis for generation, including the automatic generation, of icons or other graphical elements from subprograms in a textual language, wherein the graphical elements contain a function interface of the respective subprogram.

As discussed below, the references relied upon to support the pending rejections are not properly combinable and, even if combined, would neither disclose nor suggest the invention as recited in the pending claims.

A. Claims 18-21 and 31-33

Claims 18-21 and 31-33 stand rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 6,442,442 to Weinhofer (Weinhofer) in view of U.S. Patent No. 6,282,699 to Zhang (Zhang).

i. Claims 18-21

An obviousness rejection requires the establishment of a prima facie case that claimed subject matter, including all claim elements, would have been obvious to a person having

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ordinary skill in the art on the basis of either a single prior art reference or more than one reference properly combined. As no such prima facie case has been established, Applicants respectfully traverse these prior art rejections.

The primary reference relied upon in rejecting the pending claims, Weinhofer, is acknowledged not to disclose the following limitations, which are present in all of the pending claims:

“providing a plurality of structured text subprograms and converting the structured text subprograms to a plurality of corresponding graphical elements comprising the function interfaces corresponding to the respective structured text subprogram.”

These limitations are said to be supplied by Zhang. Applicants respectfully submit, however, that Zhang does not address, disclose or suggest these or any other aspects of the invention as claimed.

Zhang does not disclose or suggest either conversion, or, as presently claimed, generation, of graphical elements based on structured text subprograms as required by the pending claims. Nor does Zhang disclose or suggest graphical elements having function interfaces corresponding to the respective structured text subprogram, also as required.

Zhang is directed to the selection, by a user, of a “code node” where textual code is displayed. In Zhang, there are (1) no plural subprograms, (2) no generation of graphical elements corresponding to the subprograms; and, (3) no function interface. Neither the passages cited by the Examiner, nor any others in the Zhang reference, disclose or suggest these features.

Still further, and as separate points of distinction, Zhang does not mention or allude to anything analogous to “subprograms” or “structured text.” When a code node is used, the Zhang reference repeatedly indicates that a single “code node” is used.

For these reasons, claim 18, as well as all other pending rejected claims, are patentable over the cited art. Reconsideration and allowance is therefore requested.

Claim 19

Claim 19 depends from claim 18 and further recites four method steps:

(a) generating a structured textual language from the flowchart,

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- (b) converting the structural textual language in a processor-independent pseudo code;
- (c) loading the processor-independent pseudo-code into the controller, and
- (d) converting the processor-independent pseudo-code into executable processor code.

Weinhofer is acknowledged not to disclose the steps of generating a structural textual language from the flowchart, converting the structural language into a processor-independent pseudo code, loading the processor-independent pseudo code into the controller, and converting the processor-independent pseudo code into executable code.

Zhang is said to supply these missing elements, but Applicants respectfully submit that at least the conversion into processor-independent pseudo code is plainly not shown by Zhang. Neither the cited text at column 3, nor any other in that application discloses this claim limitation.

For this additional reason, claim 19 is submitted to recite patentable subject matter.

Claim 20

Claim 20 depends from claim 18 and is allowable over the art of record on the same basis.

In addition, claim 18 recites that "programming language commands are provided in the flowchart editor as a function of the associated hardware configuration." As discussed in the application, one of the advantages of the invention is that "adequate programming language commands are made available for the user in the flowchart editor for each basic machine design and/or hardware configuration. App. at page 4, para. 0013. Weinhofer is said to include icons representing motion control axes 114 and 116. This, however, does not disclose or suggest providing commands *as a function* of the associated hardware configuration, nor does it provide the advantages of the claimed method. Still further, even if this were disclosed by Weinhofer (which it is not) no teaching has been provided as to how the disclosures of Weinhofer and Zhang would be combined to arrive at the claimed method.

For these additional reasons, claim 20 is submitted to be allowable over the art of record.

Claim 21

Claim 21, dependent from claim 18, is allowable for the same reasons, set forth above.

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Claim 31

Claim 31 depends from claim 18 and is allowable for the same reasons.

In addition, it recites that the graphic elements of the flowchart – which as recited in claim 18 have been generated on the basis of the structured text subprograms and have respective function interfaces – are positioned automatically.

The rejection of claim 31 is based on the contention that Weinhofer teaches this additional limitation. It is said that Weinhofer “provides the user with a workspace 107 and make available a plurality of icons that can be dragged into the workspace 107.”

This passage suggests, if anything, that icons are provided and that they are *re-positioned manually*, by dragging. It does not, however, provide any disclosure or teaching, much less an enabling disclosure, that graphic elements that have been generated (on the basis of the structured text) are automatically positioned, such as in the editor. As described in the text of the application summarizing this aspect of the claimed invention, “When a user wants to represent a new icon in the flowchart editor, it is automatically positioned at the point that is the next, in order to correspond to the logical program sequence. This increases the user’s efficiency, since one does not have to position the icons that one has generated.” App. at page 7, para. 0024. Weinhofer’s manual re-positioning neither discloses nor suggests this recited feature.

For this additional reason, claim 31 is submitted to be patentable over the art of record.

Claim 32

Claim 32 depends from claim 18 and is patentable for the same reasons as are elaborated upon above.

Claim 32 also recites that “graphic elements of the flowchart are linked together automatically.” This is said to be shown by Weinhofer. The passage from Weinhofer relied on in support of the rejection, however, merely states that icons are “made available to the user...” and that they “are connected by a plurality of connection lines.” This passage neither discloses nor suggests that the graphical elements are linked together *automatically*, as recited.

For this additional reason, claim 32 is submitted to be patentable over the art of record.

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Claim 33

Claim 33 depends from claim 18 and is submitted to be allowable for the same reasons.

Moreover, claim 33 as now amended recites that "the flowchart is displayed in a form that can be enlarged or reduced." The passage cited from Weinhofer at column 7, lines 7-8, by contrast, indicates only that there is only a *single* display – one in which "the entire workspace 107 is viewable." There is not disclosure or suggestion of any ability to reduce or enlarge it.

Claim 33, for this additional reason, is submitted to be allowable over the art of record.

B. Claims 22-23

Claims 22-23 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Weinhofer and Zhang, further in view of U.S. Patent No. 6,263,487 to Stripf ("Stripf").

Claim 22

Claim 22 depends from claim 18 and is patentable for the same reasons, set forth above.

Claim 23

Claim 23 depends from claim 18 indirectly by way of claim 22 and is submitted to be patentable for the same reasons.

Claim 23 further recites the step of switching between three forms of representation, the forms selected from the set consisting of structured textual language, contact plan and function plan.

Weinhofer and Zhang are acknowledged not to disclose the invention as claimed. The limitation is said to be provided by Stripf, particularly the passage at column 2, lines 47-50 of that reference.

While the selected passage from Stripf states that "a user creates a control program in the form of a contact plan..., a function plan an instruction list or in any other suitable form...", it does not suggest "*switching* between three forms," as claimed. Weinhofer and Zhang are acknowledged not to disclose this feature

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It is also submitted that the combination of references is improper, since even if the references disclosed the various elements of the invention – which they do not – one of ordinary skill in the art would need to pick and choose among the references, informed by the subject application, to arrive at the claimed invention. This, however, is not a permissible basis for rejecting a patent claim as unpatentably obvious.

For this additional reason, claim 23 is submitted to be patentable over the art of record.

C. Claims 24 and 30

Claims 24 and 30 stand rejected over Weinhofer and Zhang, further in view of U.S. Patent No. 6,144,984 to DeBenedictis (“DeBenedictis”).

DeBenedictis is not a reference that relates to motion controllers, as recited in the present claims, nor even to the general field of industrial automation. Without the benefit of the present application, one of ordinary skill in the field of industrial control would not have had a motivation to look for a reference like DeBenedictis. The supposed motivation is that “the system would be enhanced.” (Office Action at page 11)

Applicants respectfully submit that this nebulous notion of “enhancement” could suggest any art combination and is neither a specific nor concrete enough motivation to look outside the field of industrial automation or to look specifically for the particular “loop or parallel branch” structure allegedly found in the DeBenedictis reference.

Claim 24

Claim 24 depends from claim 18 and is allowable over the art of record for the same reasons.

Additionally, claim 24 recites that “at least one programming language command selected from the group consisting of loop and parallel branch programming language commands is provided in motion control flowchart notation.”

Even if the combination of Weinhofer, Zhang and DeBenedictis were proper, which it is not, the combination would not disclose or suggest the invention as recited in claim 24.

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DeBenedictis at reference numeral 902, relied on as showing a parallel branch, shows merely a conditional language element.

A “parallel branch” command as made clear in the subject application at page 16, para. 0045 and Figure 6 (see “sync”), for example, is distinct from a conditional command: “this symbol, like the WHILE [i.e., loop] and IF [i.e., conditional] statements, is also represented by a hexagonal honeycomb-shaped graphical element.” Id.

Thus, none of the applied references, whether alone or in combination, disclose the recited element as claimed. Claim 24 is therefore allowable over the art of record.

Claim 30

Claim 30 also depends from claim 18 and is allowable for the same reasons.

Moreover, claim 30 recites that “function blocks that represent functions requiring a period of time, comprise step-enabling conditions in motion control flowchart notation.”

The combination of Weinhofer, Zhang and DeBenedictis is improper and, even if it were not, the combination would not teach or disclose the invention recited in claim 30.

DeBenedictis at conditional 504 of Figure 5 is cited as “determining if the task is ready for execution” and changing an argument (t) to a “time value.”

The subject application, however, makes clear that “step-enabling conditions” are “specified by a user”, such as at a “waiting condition,” to “synchronize [machine tool] functions (e.g., reference point approach or axial positioning) or their interaction.” App. at 18, para. 0049.

Thus, the recited “step-enabling conditions” are neither disclosed nor suggested by the applied art.

Claim 30 is therefore submitted to be allowable.

D. Claim 26

Claim 26 stands rejected under 35 U.S.C. § 103(a) as unpatenable over Weinhofer in view of Zhang, further in view of U.S. Patent No. 6,289,252 to Wilson (“Wilson”).

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Claim 26 depends from claim 18 and is allowable for the same reasons. In addition, claim 26 recites that "parameters are set for the function blocks via a mask input in motion control flowchart notation."

It is acknowledged that Weinhofer and Zhang, even if properly combinable, would fail to disclose or suggest this limitation. This deficiency is said to be overcome by Wilson.

Whether or not Weinhofer, Zhang and Wilson can be properly combined, which Applicants do not concede, the combination would not lead to the claimed invention. Wilson, at column 14, lines 46-47, states that "The commands are generally indicative of state changes performed by the batch server program state machine in accordance with operator input and other control input and parameters." Whether or not any parameters are set, neither this cited text nor any other text of Figures of Wilson teach or suggest setting parameters for function blocks via mask input in motion control flowchart notation, as claimed. These limitations are entirely absent from the applied references.

For this additional reason, claim 26 is submitted to be patentable over the art of record.

E. Claims 27 and 28

Claims 27 and 28 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Weinhofer in view of Zhang, further in view of U.S. Patent No. 6,553,268 to Schwenke ("Schwenke").

Claim 27

Claim 27 depends from claim 18 and is allowable for the same reasons.

Claim 28

Claim 28 depends from claim 27, which in turn depends from claim 18, and is similarly allowable.

In addition, claim 28 recites that modules, which are formed of combined function blocks, are interleaved in motion control flowchart notation. This limitation is acknowledged to be absent from Weinhofer and Zhang, but is said to be shown by Schwenke at column 15, lines 62-64. That cited passage states: "For example, one type of module specification is a module 'list' which allows zero or more component modules of a specific type (i.e., associated with a

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specific template). Reference is also made to Figure 18 which is a flowchart that includes the word "module" at several points.

The claimed invention, however, is not simply claiming the use of "modules." Rather, it specifies that modules, in turn formed of combined function blocks, are interleaved in motion control flowchart notation. Schwenke does not disclose or suggest such modules formed of combined function blocks. Nor does Schwenke show the interleaving of the modules in the flowchart. Figure 18 of Schwenke shows instructions that might refer to a module, but it does not actually show a module (of the sort recited in the claim) in a flowchart. In short, the combination, whose propriety is not conceded, neither discloses nor suggests the claimed invention.

For this additional reason, claim 28 is submitted to be patentable over the art of record.

F. Claim 29

Claim 29 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Weinhofer in view of Zhang and further in view of U.S. Patent No. 6,466,827 to Stine ("Stine").

Claim 29 depends from claim 18 and is allowable for the same reasons.

In addition, claim 29 recites the step of "assigning, in motion control flowchart notation, multiple variables in function blocks." This limitation is acknowledged not to be disclosed or suggested by Weinhofer and/or Zhang, but is said to be disclosed by Stine. The recited passage from Stine states that "each relay ladder object 66 maps to a different set of variables...."

Relay ladder logic, disclosed by Stine, is not flowchart notation. Nor would existence of a mapping between a relay ladder object and a set of variables, in Stine, disclose or suggest the step of assigning multiple variables in "function blocks."

In addition, no proper motivation has been presented for this three-way combination. The alleged motivation, as above, is that the system would be "enhanced by allowing control program executed on a standard computer, which control blocks/objects through its variables." To the extent this passage is understood, it does not show that there existed any motivation in the references or the art generally to combine the particular elements recited in the claim and could not have been arrived at without the benefit of the claimed invention. The combination is

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submitted to be improper, and no showing has been made that Stine's relay ladder objects could be combined with the (already improper) combination of Weinhofer and Zhang.

For these reasons, claim 29 is submitted to be patentable over the art of record.

F. Claim 34

Claim 34 stands rejected under 35 U.S.C. § 103(a) over Weinhofer in view of Zhang, further in view of U.S. Patent No. 4,852,047 to Lavallee ("Lavallee").

Claim 34 depends from claim 28 and is submitted to be allowable for the same reasons. Claim 34 also has been amended to more particularly point out the recited invention so that the passage "recompiling in motion control flowchart notation" now reads "retranslation into motion control flowchart notation"

In addition, claim 34 recites that "recompiling in motion control flowchart notation is possible by means of marks in the textual language."

Whereas it is conceded that Weinhofer and/or Zhang do not disclose the invention including this recitation, this is supposedly shown by Lavallee. The text from Lavallee relied on in, in pertinent part, in support of the rejection states as follows: "Thereafter, upon recompiling, the program illustrated in FIG. 2B is executed via the system of FIG. 1, with the simple editing having been accomplished through the addition of an additional set of blocks in the displayed flow chart."

Lavallee does not disclose or refer to textual language, nor retranslating such textual language into motion control flowchart notation, particularly as presently recited. For this additional reason, claim 34 is submitted to be allowable over the art of record.

IV. Objection to Claim 25

Claim 25 has been objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 25 has been amended to incorporate all of the limitations of claims 18 (as amended) and 24, from which it previously depended. It is submitted now to be in condition for allowance.

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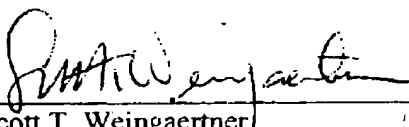
CONCLUSION

Upon entry of this Amendment, claims 1-26, 44-51, and 56-61 are pending in the Application. Applicants submit that the claims, for the reasons set forth above, are now in condition for allowance. Reconsideration and allowance are therefore respectfully requested.

If a fee is required, the Assistant Commissioner is authorized to charge the fee to Deposit Account No. 23-1703.

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Respectfully submitted,



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